

Ionospheric Scintillation Measured Using GPS Receivers during the Solar Maximum in 2000

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Amplitude and phase scintillation of GPS signals due to ionospheric irregularities can degrade the quality of navigation system performance. To assess the effects under unfavorable conditions, the scintillation of GPS L1 signals has been measured at five stations distributed in the low, middle, and high latitude regions during year 2000 when the solar activity is near a maximum. The scintillation characteristics are analyzed by processing the L-band signals acquired by specially modified dual-frequency GPS receivers capable of computing scintillation indices and spectra from amplitude and phase data sampled at 50 Hz. Standard GPS observables are collected simultaneously from co-located dual-frequency receivers with nominal specifications to provide information on expected receiver performance during conditions of scintillation. Such data are analyzed under a variety of space weather conditions covering different geographical regions. This paper will present our analysis results and summarize the effects of ionospheric scintillation on GPS navigation applications as observed during the current solar maximum.